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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,213	11/13/2001	Ulrich Stimming	3245-695PCIP	7315

7590 09/23/2005

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EXAMINER

CREPEAU, JONATHAN

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/054,213

Applicant(s)

STIMMING ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7-21-05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-13. The claims remain rejected for substantially the reasons of record. Accordingly, this action is made final.

Claim Rejections - 35 USC § 102

2. Claims 1-5, 8, 10, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilkinson et al (U.S. Patent 6,096,448). Wilkinson is directed to methods of momentarily fuel starving an anode of a PEM fuel cell. Fuel starving is defined by Wilkinson as a rise in the anode voltage (see col. 6, line 20). The starvation is performed by one of three methods: halting the fuel supply, introducing pulses of a non-reactant into the reactant stream, or connecting a transient load (see col. 3, lines 18 and 36; col. 4, line 23). Each of these methods would “impress” a positive voltage pulse on the anode. As shown in Figure 8, the voltage of the fuel cell does not change sign when the anode is fuel starved. Regarding claims 4, 5, and 8, the fuel cell may operate on reformed hydrocarbons, reformed methanol, or direct methanol (see col. 1, line 66, col. 2, line 27). Regarding claims 10 and 11, the extent to which the anode is fuel starved is controlled so that the fuel cell does not undergo cell reversal (see col. 7, line 21).

It is further noted that “means for impressing a positive voltage pulse on the anode” recited in claim 1 is considered to invoke 35 USC §112, sixth paragraph, whereas “the step of

impressing” in claim 2 is *not* considered to invoke such (see MPEP §2181). Therefore, regarding claim 1, as the methods of Wilkinson achieve a momentary rise in the anode voltage, just as the methods disclosed in the instant specification do, the methods of Wilkinson are considered to be equivalents of the methods of the instant specification. As such, Wilkinson is anticipatory of claim 1. See MPEP §2183.

Claim Rejections - 35 USC § 103

3. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al.

The reference is applied to claims 1-5, 8, 10, and 11 above. However, the reference does not expressly teach that the time period between pulses is varied in response to load changes.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Wilkinson et al. would lead the artisan to the claimed subject matter. In column 4, line 47, the reference teaches that the frequency of the pulses may be adjusted in response to a monitored parameter. In column 7, line 55, it is disclosed that cell voltage, current, power output, poison concentration, and temperature may be monitored. Fluctuations in the load would affect one or more electrical characteristics of the fuel cell, e.g., the voltage. As such, the recitation of varying the pulse frequency in response to load changes is not considered to distinguish over the reference.

4. Claims 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilkinson et al. in view of Applicants' admission of prior art.

Wilkinson et al. applied to claims 1-5, 8, 10, and 11 above. However, the reference does not expressly teach that internally reformed alcohols or hydrocarbons are used as the anode fuel, as recited in claims 6 and 7. Wilkinson et al. further do not explicitly teach that direct conversion of hydrocarbons takes place at the anode (claim 9).

On page 2 of the "Background of the Invention" section in the instant specification, Applicants admit that internally or externally reformed alcohols and hydrocarbons used as anode fuels are known.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because as exemplified by the admission in Applicants' specification, internally or externally reformed alcohols and hydrocarbons are known for use in fuel cell systems and are suitable in this capacity. The artisan, being aware of these fuels and the means for reforming them, would therefore be motivated to modify the anode fuel and/or fuel cell of Wilkinson et al.

Regarding the limitation that direct conversion of hydrocarbons takes place at the anode, the artisan would possess sufficient skill to ascertain that any unreacted hydrocarbons in a reformat stream would likely be converted directly on the anode. Accordingly, this limitation is not seen to distinguish over the Wilkinson et al. reference.

Response to Arguments

5. Applicant's arguments filed July 19, 2005 have been fully considered but they are not persuasive. Applicants state that the presently claimed subject matter is supported by the certified translation of the international application (filed as the specification of the parent application) and also the foreign priority document, thereby antedating the Wilkinson reference. However, these arguments are not found persuasive. Applicants state that "[a]lthough the original application did not expressly include the formula recited in the claims, the examples cited in the specification teach those skilled in the art the parameters defined by the formula." However, it is the Examiner's position that the examples, which include parameters that *may* fall within the presently claimed formula, are still not sufficient to show possession of the claimed invention as a whole. Specifically, Applicant relies upon a previously referenced article that is characterized in the present response as teaching that "the ideal voltage is known by those skilled in the art to be greater than 1 volt (approximately 1.2 volts)." Thus, Applicants appear to be stating that a skilled person would recognize that fuel cell of the present invention normally operates at greater than 1 volt. However, in the previous response, in a discussion of the prior art, Applicants characterized the same article as teaching that "the operating voltage is typically more than .2 volts less than the equilibrium" and further that "the operating voltage decreases as the current density increases and is typically in the range of 0.5 to 1.0V." As such, Applicant's characterization of the article between the present response and the previous response appears to be inconsistent. The Examiner previously concurred with the first characterization and as a result, withdrew the prior art rejection over Fedkiw. Now, applying the same standard to the

specification of the parent application, it cannot be said that the article supports a skilled person's interpretation that the inventive fuel cell necessarily operates at a voltage of greater than 1 volt. As such, the recitation in claim 1 that "the fuel cell has a voltage that does not change sign and at most becomes zero" is still not believed to be supported by the parent application.

Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

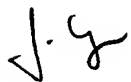
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr, can be reached at (571) 272-1414. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Primary Examiner
Art Unit 1746
September 19, 2005